

CLAIMS

1. A method of modulation detection, comprising:
receiving a signal;
generating a first decision statistic based on the received signal;
phase rotating the received signal;
5 generating a second decision statistic based on the phase rotated received
signal; and
determining a selected modulation type based on comparing the first
decision statistic with the second decision statistic.

10 2. The method according to claim 1, further comprising generating an
observation matrix from the received signal, wherein the first decision statistic is
generated based on the observation matrix.

15 3. The method according to claim 1, further comprising generating an
observation matrix from the phase-rotated received signal, wherein the second decision
statistic is generated based on the observation matrix.

4. The method according to claim 1, wherein the step of determining a
selected modulation type further comprises:
20 comparing the first decision statistic with the second decision statistic;
determining a desired modulation to be a first modulation type if the first
decision statistic is less than or equal to the second decision statistic; and
determining a desired modulation to be a second modulation type if the
second decision statistic is less than the first decision statistic.

25 5. The method according to claim 1, wherein the step of determining a
selected modulation type determines the selected modulation type to be at least one of a

Gaussian minimum shift keying modulation type and an octal phase shift keying modulation type based on comparing the first decision statistic with the second decision statistic.

- 5 6. The method according to claim 1, wherein generating a first decision statistic further comprises generating the first decision statistic based on four bursts comprising a radio link control block of the received signal.
7. The method according to claim 1, wherein the first decision statistic is
10 generated according to $\varepsilon_0 = \mathbf{b}^T (I - \mathbf{Z}_0 (\mathbf{Z}_0^T \mathbf{Z}_0)^{-1} \mathbf{Z}_0) \mathbf{b}$.
8. The method according to claim 1, wherein the second decision statistic is generated according to $\varepsilon_1 = \mathbf{b}^T (I - \mathbf{Z}_1 (\mathbf{Z}_1^T \mathbf{Z}_1)^{-1} \mathbf{Z}_1) \mathbf{b}$.

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9. A method of modulation detection, comprising:
 receiving a signal;
 constructing a first decision statistic based on a first hypothesized
 modulation type including interference suppression based on the received signal;
 5 constructing a second decision statistic based on a second hypothesized
 modulation type including interference suppression based on the received signal; and
 identifying a selected modulation type based on a comparison of the first
 decision statistic and the second decision statistic.

10 10. The method according to claim 9, wherein the first hypothesized
 modulation type is a Gaussian minimum shift keying modulation type.

11. The method according to claim 9, wherein the second hypothesized
 modulation type is an octal phase shift keying modulation type.

15 12. The method according to claim 9, further comprising:
 transforming the received signal,
 wherein the second decision statistic is based on the transformed received
 signal.

20 13. The method according to claim 12, wherein transforming the received
 signal further comprises phase rotating the received signal.

14. The method according to claim 9, wherein the first decision statistic is
 25 generated according to $\varepsilon_0 = \mathbf{b}^T (I - \mathbf{Z}_0 (\mathbf{Z}_0^T \mathbf{Z}_0)^{-1} \mathbf{Z}_0) \mathbf{b}$.

15. The method according to claim 9, wherein the second decision statistic is
 generated according to $\varepsilon_1 = \mathbf{b}^T (I - \mathbf{Z}_1 (\mathbf{Z}_1^T \mathbf{Z}_1)^{-1} \mathbf{Z}_1) \mathbf{b}$.

30 16. The method according to claim 9, wherein the step of identifying a
 selected modulation type further comprises:

comparing the first decision statistic with the second decision statistic;
determining a desired modulation to be a first modulation type if the first
decision statistic is less than or equal to the second decision statistic; and
determining a desired modulation to be a second modulation type if the
5 first decision statistic is less than the second decision statistic.

17. The method according to claim 16, wherein the first modulation type is a
Gaussian minimum shift keying modulation type.

10 18. The method according to claim 16, wherein the first modulation type is an
octal phase shift keying modulation type.

19. The method according to claim 9, wherein constructing a first and second
decision statistic further comprises constructing the respective first and second decision
15 statistics based on four bursts comprising a radio link control block of the received signal.

20. A method of modulation detection, comprising:

- receiving a signal;
- generating a first observation matrix from the received signal;
- computing first decision statistic from first observation matrix;
- 5 phase-rotating the received signal;
- generating a second observation matrix from the phase-rotated received signal;
- computing a second decision statistic from the second observation matrix;
- comparing the first decision statistic with the second decision statistic;
- 10 determining a desired modulation to be a Gaussian minimum shift keying modulation if the first statistic is less than or equal to the second statistic; and
- determining a desired modulation to be an octal phase shift keying modulation if the second statistic is less than the first statistic.

21. A communication device comprising:
a receiver configured to receive a signal; and
a modulation detector configured to detect a modulation type of the
received signal, the modulation detector including:
5 a first decision statistic generator configured to generate a first
decision statistic based on the received signal;
a phase rotator configured to phase rotate the received signal;
a second decision statistic generator configured to generate a
second decision statistic based on the phase rotated received signal; and
10 a determination module configured to determine a selected
modulation type based on comparing the first decision statistic with the second decision
statistic.

22. The communication device according to claim 21, wherein the first
15 decision statistic generator is further configured to generate an observation matrix from
the received signal, wherein the first decision statistic is generated based on the
observation matrix.

23. The communication device according to claim 21, wherein the second
20 decision statistic generator is further configured to generate an observation matrix from
the phase-rotated received signal, wherein the second decision statistic is generated based
on the observation matrix.

24. The communication device according to claim 21, wherein the
25 determination module is further configured to determine a selected modulation type by
comparing the first decision statistic with the second decision statistic, determining a
desired modulation to be a first modulation type if the first decision statistic is less than
or equal to the second decision statistic, and determining a desired modulation to be a
second modulation type if the second decision statistic is less than the first decision
30 statistic.

25. The communication device according to claim 21, wherein the determination module is further configured to determine a selected modulation type by determining the selected modulation type to be at least one of a Gaussian minimum shift keying modulation type and an octal phase shift keying modulation type based on
 5 comparing the first decision statistic with the second decision statistic.

26. The communication device according to claim 21, wherein the first decision statistic generator is further configured to generate a first decision statistic by generating the first decision statistic based on four bursts comprising a radio link control
 10 block of the received signal.

27. The communication device according to claim 21, wherein the first decision statistic is generated according to $\varepsilon_0 = \mathbf{b}^T (I - \mathbf{Z}_0 (\mathbf{Z}_0^T \mathbf{Z}_0)^{-1} \mathbf{Z}_0) \mathbf{b}$.

15 28. The communication device according to claim 21, wherein the second decision statistic is generated according to $\varepsilon_1 = \mathbf{b}^T (I - \mathbf{Z}_1 (\mathbf{Z}_1^T \mathbf{Z}_1)^{-1} \mathbf{Z}_1) \mathbf{b}$.